FORM PTO-1390 (Modified) (REV 10-95) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR
705/71503-2/8027	09/194567

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/SE97/00899	May 27, 1997	May 29, 1996

TITLE OF INVENTION

A DEVICE IN THE STATOR OF A ROTATING ELECTRIC MACHINE

APPLICANT(S) FOR DO/EO/US

Mats LEIJON et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☐ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
    A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☐ Certificate of Mailing by Express Mail
19. ☐ Other items or information:

WO/97/45928

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
	PCT/SE97/00899	705/71503-2/8027

20. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☐	Search Report has been prepared by the EPO or JPO	**$930.00**
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482)	**$720.00**
☐	No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))	**$790.00**
☒	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO	**$1,070.00**
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)	**$98.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =	**$1,070.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$130.00**	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	19 - 20 =	0	x $22.00	**$0.00**	
Independent claims	3 - 3 =	0	x $82.00	**$0.00**	
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**	
TOTAL OF ABOVE CALCULATIONS =				**$1,200.00**	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable)**.			☐	**$0.00**	
SUBTOTAL =				**$1,200.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +				**$0.00**	
TOTAL NATIONAL FEE =				**$1,200.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**			☐	**$0.00**	
TOTAL FEES ENCLOSED =				**$1,200.00**	
				Amount to be: refunded	$
				charged	$

☒ A check in the amount of **$1,200.00** to cover the above fees is enclosed.

☐ Please charge my Deposit Account No. in the amount of to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **23-0575** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

John P. DeLuca
WATSON COLE GRINDLE WATSON
1400 K Street, N.W.
Washington, D.C. 20005-2477

SIGNATURE

John P. DeLuca
NAME

25,505
REGISTRATION NUMBER

November 27, 1998
DATE

705/71503-2/8027

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	PATENT
Mats LEIJON et al.	)	Group: Unknown
Serial No: To be assigned	)	Examiner: Unknown
New appln. based on PCT/SE97/00899	)	
Filed: On Even Date	)	
A DEVICE IN THE STATOR OF A ROTATING ELECTRIC MACHINE	)	**ATTN: BOX PCT**

* * * * * *

PRELIMINARY AMENDMENT

Washington, D.C.
November 27, 1998

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Concurrently with the U.S. national filing of this application, please amend the present application as follows:

IN THE CLAIMS:

Please amend the claims as follows:

Please delete all reference numerals in paranthesis.

Claim 1. (Amended) A rotating electric machine comprising a rotor, stator and windings, the windings being arranged in several layers and including [forming] end windings outside the stator, [characterized in that] at least one of the windings

comprises a flexible conductor surrounded by a solid insulation system [comprising] including an inner layer with semiconducting properties, an insulating [part] layer surrounding the inner layer and an outer layer with semiconducting properties surrounding the insulating layer and the at least one winding [is] arranged in such way that the end windings comprise layers crossing each other.

Claim 2. (Amended) A rotating electric machine according to claim 1, [characterized in that] comprising positioning means for securing the layers [are held] in fixed positions at the end windings [by positioning means, in order to] for preventing fretting contact between the layers at the location where the layers cross.

Claim 3. (Amended) A rotating electric machine according to claim 2, wherein [characterized in that] the positioning means comprises a resilient layer located in [the] a contact area between two layers and a securing device, mutually securing the two layers, such that the resilient layer permits a certain permissible amount of relative non-sliding movement between the layers due to skewing of the resilient material [and not due to sliding] in the contact area, [the] said resilient material having a thickness [of the resilient layer being chosen taking into consideration] sufficient to accommodate the permissible relative movement.

Claim 4. (Amended) A rotating electric machine according to claim 3, wherein [characterized in that] the resilient layer comprises a length [piece] of slit rubber tubing cladding around each outer layer in the contact area of the crossings.

Claim 5. (Amended) A rotating electric machine according to claim 3 wherein [or 4, characterized in that] the securing device comprises a bundling tape wrapped around [two] resilient layer[s] at the contact location.

Claim 6. (Amended) A rotating electric machine according to claim 1 wherein [any one of claim 1-5, characterized in that] the layers are held in fixed positions at outer attachment points in the stator.

Claim 7. (Amended) A rotating electric machine according to claim 1, wherein [any one of claim 1-6, characterized in that] the positioning means [are made of materials with defined] comprises a material having a selected resistivity [such that it can be insulating or electrically conductive].

Claim 8. (Amended) A rotating electric machine according to claim 1 wherein [any one of the preceding claims, characterized in that] the at least one winding comprises a cable.

Please add the following new claims:

--9. A rotating electric machine according to claim 1, wherein the positioning means comprises at least one of a conductor and an insulator.

10. A protective device for end windings of a rotating electric machine having a rotor, stator and at least one winding comprising a flexible cable arranged in several layers and having end windings outside the stator, including a conductor, an inner layer with semiconducting properties surrounding the conductor, an insulating layer surrounding the inner layer and an outer layer with semiconducting properties surrounding the insulating layer, and wherein the end windings form layers crossing each other and coming into contact and positioning means for securing portions of the cable in the layers in fixed positions in order to prevent fretting contact between portions of the cable which come into contact where said cables cross each other.

11. A device according to claim 10, wherein the positioning means comprises a resilient layer located where the cables come into contact between two layers.

12. A device according to claim 11 wherein the positioning means comprises a securing device, mutually securing the two layers while allowing a selected permissible amount of non-sliding relative movement between the layers.

13. A device according to claim 12 wherein the relative movement between the layers is due to skewing of the resilient material and the resilient layer has a selected thickness sufficient to accommodate the permissible relative movement.

14. A device according to claim 13 wherein the resilient layer comprises a sleeve disposed around each portion of the cable in the contact area where the cables cross.

15. A device according to claim 14 wherein the sleeve comprises a length of rubber tubing having a longitudinal slit.

16. A device according to claim 10 wherein the positioning means comprises a bundling tape wrapped around two layers where the cables come into contact where the cables cross.

17. A device according to claim 11 wherein the layers are held in fixed positions at outer attachment points in the stator.

18. A device according to claim 11 wherein the positioning means comprise materials with defined resistivity including insulators and conductors.

19. A rotating electric machine comprising a rotor, stator and windings at least one of the winding comprises a flexible conductor surrounded by a solid insulation system including an inner layer with semiconducting properties, an insulating part surrounding the inner layer, and an outer layer with semiconducting properties surrounding the insulating layer and the at least one winding in the form of a cable having end winding portions arranged in overlapping layers crossing and contacting each other in contact areas outside of the stator, a plurality of resilient sleeves each surrounding the cable located between layers in the contact areas, and means for securing the layers with the sleeves in non-sliding contact.--

REMARKS

This Preliminary Amendment is filed for the purpose of conforming the claims to U.S. practice and for deleting multiple dependencies. Also, new claims have been added. Entry and allowance of the claims is earnestly solicited.

Respectfully submitted,

John P. DeLuca
Registration No. 25,505

WATSON COLE GRINDLE WATSON, P.L.L.C.
1400 K Street, N.W., 10th Floor
Washington, D.C. 20005-2477
(202) 628-3600

A DEVICE IN THE STATOR OF A ROTATING ELECTRIC MACHINE

The present invention relates to rotating electrical machines, e.g. synchronous machines, but also to dual-fed machines, applications in asynchronous static current converter cascades, outerpole machines and synchronous flow machines. The invention relates to a device for avoiding wear between the cables in coil-end packages on the stator in a rotating electric machine. The device according to the invention is designed for use with high voltages, by which is meant electric voltages exceeding 10 kV. A typical working range for the device according to the invention may be 36-800 kV.

The problem addressed by the invention appears in connection with a high-voltage electric alternating current machine, primarily intended as generator in a power station for generating electric power. Such machines have conventionally been designed for voltages in the range 15-30 kV and 30 kV has normally been considered to be an upper limit. This generally means that a generator must be connected to the power network via a transformer which steps up the voltage to the level of the power network, i.e. in the range of 130-400 kV.

BACKGROUND ART, THE PROBLEMS

The problems addressed by the invention can be exemplified in connection with a high voltage electric alternating current machine. Such machine can be a generator in a power station for generating electric power. Conventionally such machines were designed for voltages in the range 15-30kV and 30 kV has normally been considered to be an upper limit. This means that

generally a generator must be connected to a power network via a transformer which steps up the voltage to the level of the power network.

In order to design a rotating electric machine for higher voltages, the ac windings of the stator have to form several layers with gradually increasing radius, thus permitting a build-up of higher voltages without undue increase of the layer-to-layer voltage. This means that the end windings on a stator have to accommodate several, and at least more than two, layers for each winding. There are many problems with increasing the number of layers in the end windings. The electric field surrounding the end windings cause problems since the field will deviate from its radial extension around the conductors in the stator to an axial extension when layers in the end windings. The electric field surrounding the end windings cause problems since the field will deviate from its radial extension around the conductors in the stator to an axial extension when outside the stator. These problems are normally reduced by so called field control arrangements. In increasing the number of layers , the field control arrangements become excessively complex.

Certain attempts to a new approach as regards the design of synchronous machines are described, inter alia, in an article entitled "Water-and-oil-cooled Turbogenerator TVM-300" in J. Elektrotechnika,No. 1, 1970, pp 6-8, in US 4,429,244 "Stator of Generator" and in Russian patent document CCCP Patent 955369.

The water- and oil-cooled synchronous machine described in J. Elektrotechnika is intended for voltages up to 20 kV. The article describes a new insulating system consisting of oil/paper insulation, which makes it possible to immerse the stator completely in oil. The oil can then be used as a coolant while at the same time using it as insulation. To prevent oil in the

stator from leaking out towards the rotor, a dielectric oil-separating ring is provided at the internal surface of the core. The stator winding is made from conductors with an oval hollow shape provided with oil and paper insulation. The coil sides with their insulation are secured to the slots made with rectangular cross section by means of wedges. As coolant, oil is used both in the hollow conductors and in holes in the stator walls. Such cooling systems, however, entail a large number of connections of both oil and electricity at the coil ends. The thick insulation also entails an increased radius of curvature of the conductors, which in turn results in an increased size of the winding overhang.

The above mentioned US patent relates to the stator part of a synchronous machine which comprises a magnetic core of laminated sheet with trapezoidal slots for the stator winding. The slots are tapered since the need of insulation of the stator winding is smaller towards the interior of the rotor where that part of the winding which is located nearest the neutral point is disposed. In addition, the stator part comprises a dielectric oil-separating cylinder nearest the inner surface of the core which may increase the magnetization requirement relative to a machine without this ring. The stator winding is made of oil-immersed cables with the same diameter for each coil layer. The layers are separated from each other by means of spacers in the slots and secured by wedges. What is special for the winding is that it comprises two so-called half-windings connected in series. One of the two half-windings is disposed, centered, inside an insulation sleeve. The conductors of the stator winding are cooled by surrounding oil. The disadvantages with such a large quantity of oil in the system are the risk of leakage and the considerable amount of cleaning work which may result from a fault condition. Those parts of

the insulation sleeve which are located outside the slots have a cylindrical part and a conical termination reinforced with current-carrying layers, the duty of which is to control the electric field strength in the region where the cable enters the end winding.

From CCCP 955369 it is clear, in another attempt to raise the rated voltage of the synchronous machine, that the oil-cooled stator winding comprises a conventional high-voltage cable with the same dimension for all the layers. The cable is placed in stator slots formed as circular, radially disposed openings corresponding to the cross-section area of the cable and the necessary space for fixing and for coolant. The different radially disposed layers of the winding are surrounded by and fixed in insulated tubes. Insulating spaces fix the tubes in the stator slot. Because of the oil cooling, an internal dielectric ring is also needed here for sealing the coolant against the internal air gap.

SUMMARY OF THE INVENTION, EXAMPLES

An object of the invention is to provide a rotating electric machine, which can be directly connected to a power network without an intermediate transformer and that the rotating machine can comprise several layers of winding arranged in such a way that the machine will not become excessively large and complex.

The above object can be fulfilled by a machine in accordance with claim 1.

By using high-voltage insulated electric conductors, , in the stator winding, with permanent insulation, which comprises an inner layer, surrounding the conductor, with semiconducting properties and that the insulation is also provided with at least one additional outer

layer, surrounding the insulation, with semiconducting properties. The inner semiconducting layer shall function in such a way as to even the potential of the electric field outside the inner layer and the outer layer shall on one part function in such a way as to evening the potential by connecting it to a selected potential and on the other part by enclosing the electric field around the conductors within the outer layer. Semiconducting properties in this context is a material which has a considerably lower conductivity than an electric conductor but which does not have such a low conductivity that it is an insulator. For example, the inner and outer semiconducting layers may have a resistivity within the interval 10-6 Wcm - 100 kWcm. By using only insulating layers which may be manufactured with a minimum of defects and, in addition, providing the insulation with an inner and an outer semiconducting layer, it can be ensured that the thermal and electric loads are reduced. the voltage of the machine can be increased to such levels that it can be connected directly to the power network without an intermediate transformer. The step-up transformer is thus eliminated. Another advantage is that the design of the insulation system will make it possible to arrange the layers of the windings more freely. At the end windings it is possible to let the layers cross each other and to mix layers of windings with different voltage. This makes it possible to make the machine more compact, even though it comprises several layers of windings.

Problems can arise in these high-voltage electric machines in that the cables have a tendency to vibrate, thereby causing the large end windings to vibrate in relation to each other with frequencies of double the frequency of the mains voltage, i.e. 100 Hz in power supply systems with a nominal mains frequency of 50 Hz and 120 Hz in power supply systems with a nominal mains

frequency of 60 Hz, and with amplitudes of approximately 0.1 mm. This means that the cables, which are provided externally with a semi-conducting layer, with the help of which its potential in relation to the environment shall be defined, may easily be damaged due to wear against adjacent cables in the end windings . In order to minimize the fretting of the cables against each other the cables are held in fixed positions at the end windings by positioning means, in order to prevent fretting contact between the cables at the location where the cables cross.

The invention will now be described in more detail with reference to the accompanying drawings in which

Figure 1 shows a perspective view of a part of the coil-end package at one end of the stator in an electric alternating current generator,

Figure 2 shows a cross section through a cable of the type used in the stator winding,

Figure 3 shows a cross section through a cable in the end-coil stack with a device according to the present invention, and

Figure 4 shows the contact area between two cables in the coil-end package.

Figure 1 illustrates a portion of the coil-end package in an alternating current generator. With its inner vertical surface 2, the stator 1 surrounds the rotor of the generator with an air gap. Cables 4 forming the winding protrude from a slot in the upper surface 3 of the stator 1 to define an arc and enter another slot in the stator. These arcs of cables or coils form coil

ends which come into contact with each other. One such contact point is designated 5 in Figure 1.

The arc-shaped coil ends become relatively loose and slippery and the vibration reached by the cables during operation with a frequency of approximately 100 Hz causes relative movement between the cables in the contact area, a relative movement with an amplitude of approximately 0.1 mm. Such movement would cause damaging wear between the cables which in this case have no sheath.

Figure 2 shows a cross section of a cable 4 used in the present invention. The cable 4 comprises a conductor 6 with circular cross section, consisting of a number of strands and made of copper, for instance. This conductor 6 is arranged in the middle of the cable 4. Around the conductor 6 is a first semi-conducting layer 7. Round the first semi-conducting layer 7 is an insulating layer 8 of XLPE insulation, for instance. Around the insulation layer 8 is a second semi-conducting layer 9. In this context a cable does not include the outer protective sheath which normally surrounds a cable for power distribution.

Figure 3 shows a cross section through such a cable with a device according to the invention. In order to avoid wear between the cables in the contact area the cables there must be mutually secured while permitting relative movement which does not entail the cables sliding against each other and thus becoming worn. To this end the cables 4 are provided in the contact area with a rubber layer 10, suitably a tube or sleeve slit at 11 to enable it to be fitted onto the cables. The rubber material is not restricted to any particular material, but includes all any kind of material which is rubber-elastic. Figure 4 shows how the cables have been secured to each other at the contact point 5 by

means of a securing device in the form of a bundling tape 12. It is also suitable for the cables 4 to be similarly secured and clad with elastic even at outer, fixed points on the stator.

The thickness of the rubber layer in the sleeve 10 shall be sufficient to allow relative movement between the cables through skewing of the resilient material but without sliding between the surfaces. Wear of the cables is thus prevented, wear which would quickly damage the outer semi-conductor on the XLPE insulation. The thickness of the rubber layer may vary between 0.5 and 5 mm depending on the diameter of the cable, which may vary between 10 and 150 mm.

CLAIMS

1. A rotating electric machine comprising a rotor, stator and windings, the windings being arranged in several layers and forming end windings outside the stator, **characterized** in that at least one of the windings comprise a flexible conductor surrounded by a solid insulation system comprising an inner layer with semiconducting properties, an insulating part and an outer layer with semiconducting properties and the at least one winding is arranged in such way that the end windings comprise layers crossing each other.

2. A rotating electric machine according to claim 1, **characterized** in that the layers are held in fixed positions at the end windings by positioning means, in order to prevent fretting contact between the layers at the location where the layers cross.

3. A rotating electric machine according to claim 2, **characterized** in that the positioning means comprise a resilient layer located in the contact area between two layers and a securing device, mutually securing the two layers, such that the resilient layer permit a certain relative movement between the layers due to skewing of the resilient material and not due to sliding in the contact area, the thickness of the resilient layer being chosen taking into consideration the permissible relative movement.

4. A rotating electric machine according to claim 3, **characterized** in that the resilient layer comprises a piece of slit rubber tubing clad around each layer in the contact area of the crossings.

5. A rotating electric machine according to claim 3 or 4, **characterized** in that the securing device comprises

a bundling tape wrapped around two layers at the contact location.

6. A rotating electric machine according to any one of claim 1-5, **characterized** in that the layers are held in fixed positions at outer attachment points in the stator.

7. A rotating electric machine according to any one of claim 1-6, **characterized** in that the positioning means are made of materials with defined resistivity such that it can be insulating or electrically conductive.

8. A rotating electric machine according to any one of the preceding claims, **characterized** in that the at least one winding comprises a cable.

Fig 1

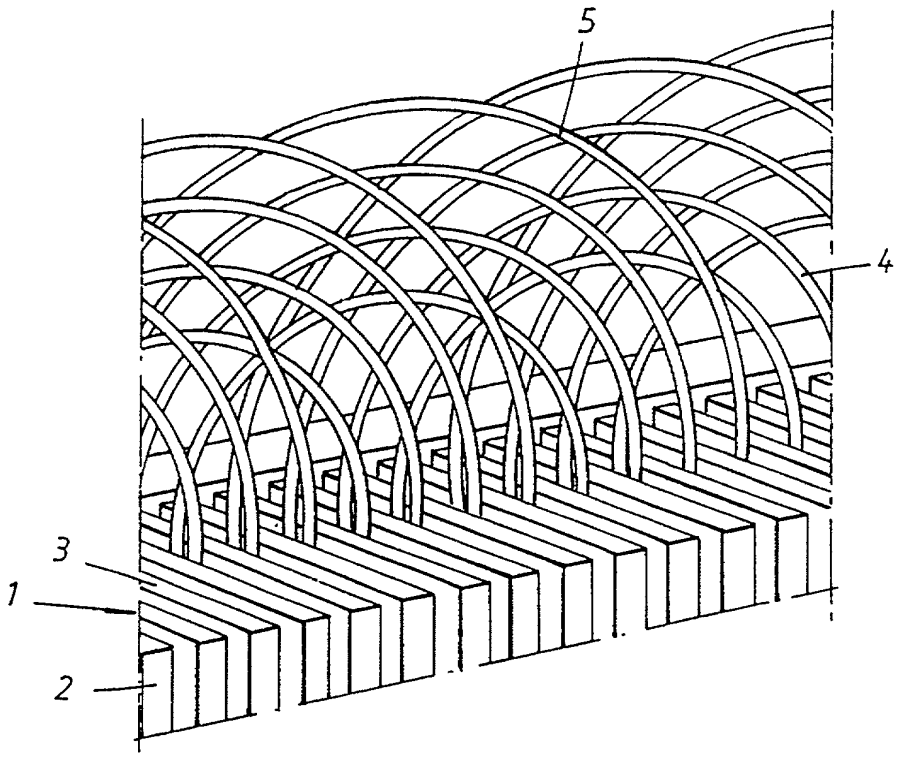


Fig 2

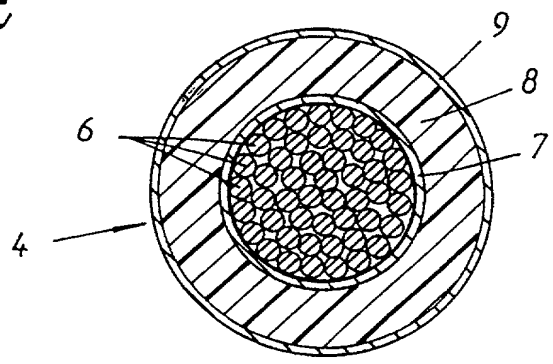


Fig. 3

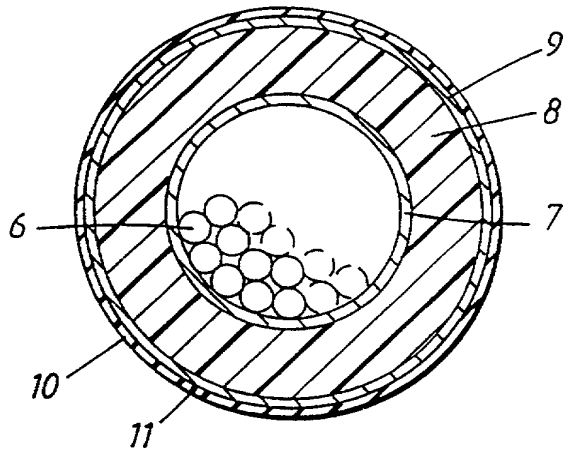
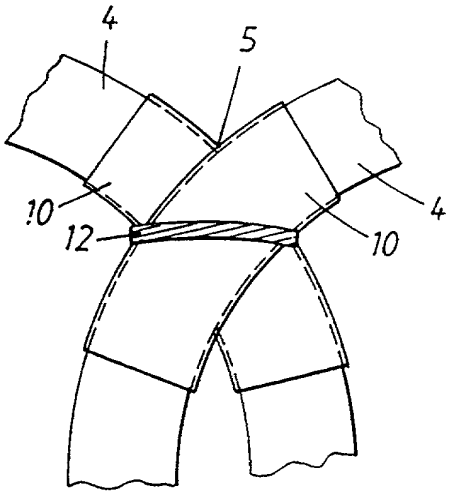


Fig. 4



COMBINED DECLARATION AND POWER OF ATTORNEY FOR **UTILITY** PATENT APPLICATION (Includes PCT)	Attorney Docket No. 705/71503-2/8027

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name; that

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:
A DEVICE IN THE STATOR OF A ROTATING ELECTRIC MACHINE

the specification of which (check one): [ ] is attached hereto.

[ ] was filed on _____ as Application Serial No. _____ and was amended on _____.

[X] was filed as PCT international application no. PCT/SE97/00899 on May 27, 1997, and was

amended under PCT Article 19 on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I do not know and do not believe the claimed invention was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application.

I hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application(s) on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
9602079-7 (Number)	SWEDEN (Country)	29/05/96 Day/Month/Year Filed	[x] Yes	[ ] No
9602096-1 (Number)	SWEDEN (Country)	29/05/96 Day/Month/Year Filed	[x] Yes	[ ] No
_____ (Number)	_____ (Country)	_____ Day/Month/Year Filed	[ ] Yes	[ ] No

I hereby claim the benefit under Title 35, United States Code, §119 (e) of any United States provisional application(s) listed below:

Application No.	Day/Month/Year Filed	Application No.	Day/Month/Year Filed
_____	_____	_____	_____

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

COPY

Application Serial No.	Filing Date	Status (patented, pending, abandoned)
Application Serial No.	Filing Date	Status (patented, pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith; Watson Cole Grindle Watson, P.L.L.C.; Lawrence R. Radanovic, Reg. No. 23,077; Richard H. Tushin, Reg. No. 27,297; Donald N. Huff, Reg. No. 27,561; John P. DeLuca, Reg. No. 25,505; Walter D. Ames, Reg. No. 17,913 and Roy W. Butrum, Reg. No. 18,290. Direct all telephone calls to telephone no. **(202) 628-3600** and faxes to **(202) 628-3650**.

Address all correspondence to **Watson Cole Grindle Watson, P.L.L.C., 10th Floor, 1400 K Street, N.W., Washington, D.C. 20005-2477.**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole, First Inventor	Inventor's Signature	Date
Mats LEIJON		98-11-23
Residence: Västerås, SWEDEN SE		Citizenship: Swedish
Post Office Address: Hyvlargatan 5, S-723 35 Västerås, SWEDEN		
Full Name of Second, Joint Inventor	Inventor's Signature	Date
Bertil LARSSON		98-11-28
Residence: Västerås, SWEDEN SE		Citizenship: Swedish
Post Office Address: Sammetsvägen 12, S-724 76 Västerås, SWEDEN		
Full Name of Third, Joint Inventor	Inventor's Signature	Date
Hans-Olof KALLDIN		99-01-28
Residence: Västerås, SWEDEN SE		Citizenship: Swedish
Post Office Address: Grenadjärgatan 9, S-723 46 Västerås, SWEDEN		

Full Name of Fourth, Joint Inventor Sören BERGGREN	Inventor's Signature Sören Berggren	Date 98-12-04
Residence: Västerås, SWEDEN SE		Citizenship Swedish
Post Office Address: Vetterstorpsgatan 30, S-724 62 Västerås, SWEDEN		
Full Name of Fifth, Joint Inventor	Inventor's Signature	Date
Residence:		Citizenship
Post Office Address:		
Full Name of Sixth, Joint Inventor	Inventor's Signature	Date
Residence:		Citizenship
Post Office Address:		
Full Name of Seventh, Joint Inventor	Inventor's Signature	Date
Residence:		Citizenship
Post Office Address:		